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| 10/006,959 | 11/05/2001 | Todd D. Creger | 00-608 | 2767 |

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| EXAMINER | |
|---|---|
| DAY, HERNG DER | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2128 | |

DATE MAILED: 01/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/006,959 | CREGER ET AL. | |
| | Examiner | Art Unit | |
| | Herng-der Day | 2128 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *05 November 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 November 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

**1.** Claims 1-12 have been examined and claims 1-12 have been rejected.

### *Drawings*

**2.** The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign not mentioned in the description:

(a) Tune Neural Net Weights 718, in Fig. 7.

A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application.

### *Claim Rejections - 35 USC § 112*

**3.** The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**4.** Claims 7-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**4-1.** Claim 7 recites the limitations "the computed parameter" in line 9 of the claim and "the compared data" in line 12 of the claim. There are insufficient antecedent basis for these limitations in the claim.

**4-2.** Claims 8-9 are rejected as being dependent on a rejected claim.

### *Claim Rejections - 35 USC § 101*

**5.** 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

**6.** Claims 10-12 are rejected under 35 U.S.C. 101 because the inventions as disclosed in claims are directed to non-statutory subject matter.

**6-1.** Claims 10-12 are not tangibly embodied because they could be practiced with pencil and paper. It is not in the technology arts.

**6-2.** The Examiner acknowledges that even though the claims are presently considered non-statutory they are additionally rejected below over the prior art. The Examiner assumes the Applicants will amend the claims to overcome the 101 rejections and thus make the claims statutory.

### *Claim Rejections - 35 USC § 102*

**7.** The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**8.** Claim 1-5 and 7-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Jelley et al., U.S. Patent Application Publication 2002/0138240 A1 published September 26, 2002 and filed April 2, 2002.

**8-1.** Regarding claim 1, Jelley et al. disclose a method for compensating for variations in modeled parameters of a plurality of machines having similar characteristics and performing similar operations, including the steps of:

establishing a model development machine (measured operating characteristics from tests, paragraph [0020]);

obtaining data relevant to the modeled parameters, characteristics, and operations of each of at least one test machine (input design parameters and operating conditions, paragraph [0019]);

comparing the data from each test machine to corresponding data of the model development machine (training the neural network, paragraph [0020]); and

updating at least one of an estimator and a model of each test machine in response to variations in the compared data (generating a numeric algorithm from the trained neural network, paragraph [0020]).

**8-2.** Regarding claim 2, Jelley et al. further disclose each of the model development machine and the at least one test machine includes a neural network for modeling a parameter of each respective machine (neural network, paragraph [0020]), and wherein updating at least one of an estimator and a model includes the step of updating an estimator for each neural network in response to variations in the compared data (predicts an operating characteristic, paragraph [0020]).

**8-3.** Regarding claim 3, Jelley et al. further disclose each of the model development machine and the at least one test machine includes a neural network for modeling a parameter of each respective machine (neural network, paragraph [0020]), and wherein updating at least one of an estimator and a model includes the step of updating each neural network in response to variations in the compared data (generating a numeric algorithm, paragraph [0020]).

**8-4.** Regarding claim 4, Jelley et al. further disclose obtaining data includes the step of obtaining data from each test machine relevant to operating characteristics of each respective test machine (operating characteristics, paragraph [0025]).

**8-5.** Regarding claim 5, Jelley et al. further disclose obtaining data includes the step of obtaining data from a work site in which a respective test machine is located, the data including data relevant to characteristics of the work site and operations of the test machine at the work site (rock type, paragraph [0024]).

**8-6.** Regarding claim 7, Jelley et al. disclose a method for compensating for variations in modeled parameters of a test machine compared to a model development machine, including the steps of:

delivering a neural network model from the model development machine to the test machine (neural network, paragraph [0020]);

determining a parameter on the test machine (design parameter, paragraph [0020]);

estimating the parameter on the test machine with the delivered neural network;

comparing the computed parameter with the estimated parameters (training the neural network, paragraph [0020]); and

updating at least one of an estimator and the neural network model on the test machine in response to variations in the compared data (generating a numeric algorithm from the trained neural network, paragraph [0020]).

**8-7.** Regarding claim 8, Jelley et al. further disclose determining a parameter includes the step of calculating the parameter (training the neural network, paragraph [0020]).

### *Claim Rejections - 35 USC § 103*

**9.** The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**10.** Claims 6 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jelley et al., U.S. Patent Application Publication 2002/0138240 A1 published September 26, 2002 and filed April 2, 2002, in view of Talbott, U.S. Patent 6,411,908 B1 issued June 25, 2002, and filed August 2, 2000.

**10-1.** Regarding claim 6, Jelley et al. fail to expressly disclose obtaining data includes the step of obtaining data relevant to aging of each test machine. Although the existing prior art methods generally assume that the wear rate is substantially constant over the life of the drill bit, Jelley et al. suggest that it may not be true (paragraph [0015]).

Talbott discloses "Probabilistic modeling of machine life and other non-parametric reliability methods developed over the past five decades consider only age, and not condition, as a predictor of remaining life". "Now that new sensor technologies offer a means to track

condition as well as age, better estimates of residual life can result (Talbott, column 1, lines 18-24). In other words, considering the fact that the wear rate may not be constant over the life of a machine, both condition and age should be taken into account.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Jelley et al. to incorporate the teachings of Talbott to obtain the invention as specified in claim 6 to take into account the fact that the wear rate may not be constant over the life of a machine as suggested by Jelley et al.

**10-2.** Regarding claim 10, Jelley et al. disclose a method for compensating for variations in modeled parameters of a plurality of machines having similar characteristics and performing similar operations, including the steps of:

collecting data from each of the plurality of machines relevant to the modeled parameters, characteristics, and operations of each respective machine (input design parameters and operating conditions, paragraph [0019]);

determining a level of variability of the characteristics of each machine (operating conditions, paragraph [0024]; training the neural network, paragraph [0020]);

determining a level of variability of the operations of each machine relevant to a respective work site (rock type, paragraph [0024]; training the neural network, paragraph [0020]);

updating at least one of an estimator and a model of each machine in response to the level of variability of the characteristics of each machine, the level of variability of the operations of each machine relevant to each work site (generating a numeric algorithm from the trained neural network, paragraph [0020]).

Jelley et al. fail to expressly disclose determining an aging factor of each machine and updating at least one of an estimator and a model of each machine also in response to the aging factor. Although the existing prior art methods generally assume that the wear rate is substantially constant over the life of the drill bit, Jelley et al. suggest that it may not be true (paragraph [0015]).

Talbott discloses "Probabilistic modeling of machine life and other non-parametric reliability methods developed over the past five decades consider only age, and not condition, as a predictor of remaining life". "Now that new sensor technologies offer a means to track condition as well as age, better estimates of residual life can result" (Talbott, column 1, lines 18-24). In other words, considering the fact that the wear rate may not be constant over the life of a machine, both condition and age should be taken into account.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Jelley et al. to incorporate the teachings of Talbott to obtain the invention as specified in claim 10 to take into account the fact that the wear rate may not be constant over the life of a machine as suggested by Jelley et al.

**10-3.** Regarding claim 11, Jelley et al. further disclose determining a level of variability of the operations of each machine relevant to a respective work site includes the step of determining a level of variability as a function of differences in characteristics between each work site (rock type, paragraph [0024]).

**10-4.** Regarding claim 12, Talbott further disclose determining an aging factor of each machine includes the step of determining a level of variability of operations of each machine as a function

of aging of each respective machine (Talbott, track condition as well as age, column 1, lines 18-24).

**11.** Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jelley et al., U.S. Patent Application Publication 2002/0138240 A1 published September 26, 2002 and filed April 2, 2002, in view of Applicants' assertions.

**11-1.** Regarding claim 9, Jelley et al. fail to expressly disclose updating a neural network model includes the step of tuning at least one weight in the neural network model. Applicants' asserts, as described in paragraph [35] of the specification, "Neural network weights are well known in neural network theory and applications".

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Jelley et al. to incorporate Applicants' assertions to obtain the invention as specified in claim 9 because tuning weight in the neural network model is implied and well known in neural network theory and applications as asserted by Applicants.

## *Conclusion*

**12.** The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

Reference to Hall, U.S. Patent 5,586,033 issued December 17, 1996, is cited as disclosing a neural network trained as general and local models.

Reference to Lo, U.S. Patent 5,987,444 issued November 16, 1999, is cited as disclosing robust neural systems.

Reference to Quist et al, U.S. Patent 6,199,018 B1 issued March 6, 2001, is cited as disclosing a distributed diagnostic system.

**13.** Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Herng-der Day whose telephone number is (571) 272-3777. The Examiner can normally be reached on 9:00 - 17:30.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Jean R. Homere can be reached on (571) 272-3780. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Herng-der Day H.D.
January 10, 2005

Thai Phan
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AU: 2128